

## **Are All Arsenic Exposures Toxic? Supporting Regional Risk Assessments through Improved Arsenic Speciation Methodology**

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Arsenic exposure assessments require the evaluation of the relative contribution of both media (water, food, etc.) and routes of exposure (ingestion, inhalation, dermal). For arsenic, the important media are predominantly water and food; therefore, the route of concern for exposure is ingestion. In addition, the toxicity of an exposure is strongly dependent on the chemical form of the arsenic ingested. Water contains predominantly toxic arsenic while foods contain a mixture of both toxic and non-toxic arsenicals. Thus, an accurate risk assessment must assess the exposure from water and food and must differentiate (or speciate) the toxic and non-toxic arsenicals present in foods. Furthermore, speciation of arsenicals in foods will aid in: 1) formulating an accurate relative source contribution (water vs. food), 2) conducting exposure studies to determine dose vs. response, and 3) help identify sub-populations which are highly exposed. These types of information become part of the scientific foundation used in formulating drinking water regulations.

Seafood has been identified as the major dietary contributor to arsenic exposure by the US FDA. US EPA's Region 10 (Alaska, Washington, Oregon, Idaho) seafood consumption rates are often well above average national values. For example, Native American (Washington and Oregon) and Alaska Native studies have indicated average seafood consumption rates up to ten times greater than the US EPA average estimate of 6.5 g/day. Thus, improved analytical methodology is needed to determine whether these sub-populations are being exposed to toxic or non-toxic arsenic species. As a result, NERL has developed an analytical procedure for the speciation of arsenic in seafoods and transferred it to the Region 10 laboratory. This procedure is being used to generate a preliminary speciation based database for arsenic in seafoods and should aid regulators in estimating the relative source contribution of food vs. water. Ultimately, this will aid the Region in assessing the impact of their elevated seafood consumption rates.

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